

Modelling of salinity and flushing time in strongly restricted tidal inlet lagoon: A Rekawa lagoon, south coast of Sri Lanka

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Key words: Rekawa Lagoon, flushing time

Abstract

Rekawa Lagoon is small, seasonally open strongly restricted tidal inlet in the south coast of Sri Lanka. The sea level variability, salinity and water exchange in the lagoon are studied using field measurements and numerical models. The field campaign was made during the period when the lagoon mouth was open. Sea level variation in the lagoon due to tides is very small and it is only 1/6th of the oceanic range, although, semi diurnal tides are strongly filtered through the inlet canals compared to diurnal and fortnightly tides. Salinity in the lagoon varies from zero to more than 30psu and strongly related to freshwater supply.

1-D tidal numerical model is developed and applied to Rekawa Lagoon to predict tidal sea level variation in the lagoon. Observed and model predicted sea levels were compared for model calibration. The bottom friction coefficient, C_d of 0.002 gave a good agreement between the observed and model simulated sea levels. Then, three-dimensional hydrodynamic Estuary Lake Computer Model (ELCOM) applied to simulate salinity variations, residual circulation and water exchange for different situations. When the lagoon mouth is open and no river input, the lagoon salinity increases up to 30psu within 30 days from initial state salinity of 10 psu. The model runs were also made with starting initial lagoon salinity with 34 psu and continuous river discharge of $15\text{m}^3\text{s}^{-1}$, after 12 days lagoon salinity decreed to 05 psu. The model estimated flushing time of the lagoon is in the order of 30 days.

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